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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/682,054	10/09/2003	Kim Hwee Tan	APS03-002	8182

7590 03/22/2005
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EXAMINER

PHAM, THANH V

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 03/22/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

3-

Office Action Summary	Application No. 10/682,054	Applicant(s) TAN ET AL.	
	Examiner Thanh V. Pham	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-68 is/are pending in the application.
 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-68 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|--|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>12/22/03</u> . | 6) <input type="checkbox"/> Other: ____ |

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: *the die perimeter 102 described on page 9 is not shown anywhere in any figure, those skilled in the art could not decide whether the die perimeter as the base for RF shield or hermetic shield is at the outermost or the cut-line around bumps 34 in fig. 8 or the rectangular or square shape 34 in figs. 10.* Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Specification

2. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

Claim Objections

3. Claims 10, 32 and 55 are objected to because of the following informalities:
"100" should be deleted. Appropriate correction is required.
4. Claims 16, 19, 20 and 38, 41, 42 and 61, 64, 65 are objected to because of the following informalities: "comprised of ... or" should be deleted, --consisting of ... and— are inserted instead, see MPEP 2173.05(h). Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

6. Claims 1-2, 9, 11-19 and 24, 31, 33-41 and 46-47, 54, 56-64 are rejected under 35 U.S.C. 102(b) as being anticipated by Kondoh et al. US 5,448,114 (provided by applicant).

Re claims 1-2, 24 and 46-47, the Kondoh et al. reference discloses a die and method of forming a die 1 comprising the steps: providing a substrate; and forming one or more pillar structures 3/4 over the substrate in a pattern. Wherein the one or more pillar structures have a rectangular shape, *a side of element 3* (or the square shape of element 4 is considered as a special rectangular with the two consecutive equal sides) or round shape, col. 10, lines 57-58.

Re claims 9, 31 and 54, the pillar structure pattern includes 2 rows and 2 columns, fig. 2.

Re claims 11-13, 33-35 and 56-58, the one pillar structure 3 is wall-shaped pillar structure forming a square, fig. 2.

Re claims 14-15, 36-37, 59-60, the one or more pillar structures are comprised of a lead-free material, copper, col. 11, lines 50-51.

Re claims 16-19, 38-41, 61-64, the one or more pillar structures are comprised of nickel (col. 14, line 24), a lower copper layer and an overlying reflowed solder layer (col. 11, lines 61-62), the solder layer being comprised of 60 % tin and 40 % lead (col. 14, lines 28-29).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 3-8, 10, 20-23 and 25-30, 32, 42-45 and 48-53, 55, 65-68 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kondoh et al. as applied to claims 1-2, 9, 11-19 and 24, 31, 33-41 and 46-47, 54, 56-64 above, and further in view of the following reasons.

The Kondoh et al. reference discloses substantially all of the invention. Although it discloses "the bump 4 is approximately 100 micron square and 50 micron high, and

the wall member 3 is approximately 300 micron wide and 50 micron high" (col. 9, lines 40-42), "the size of the chip is approximately 6 mm square and the number of pads is approximately 40. Therefore, the contact area of the bump is approximately 0.4 mm^2 and that of the wall is approximately 4.0 mm^2 ", col. 10, lines 3-7, e.g.; it does not disclose the length, width, height and distance apart of each of the bumps nor the diameter of the sound pillar structure as claimed in claims 3-8, 10, 21-22 and 25-30, 32, 43-44 and 48-53, 55, 66-67. However, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose these particular dimensions because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966). See also MPEP 2144.04(IV)(B).

Re claims 20, 42 and 65, the Kondoh et al. reference discloses the solder layer being comprised of 60 % tin and 40 % lead (col. 14, lines 28-29). Choice of the solder layer being consisting of about 63 % tin and 37 % lead or 100 % tin would have been a

matter of routine optimization because the ratio of material in a layer are known to affect device properties and would depend on the desired device density on the finished wafer and the desired device characteristics. One of ordinary skill in the art would have been led to the recited ratio through routine experimentation to achieve desired deposition and reaction rates.

Re claims 23, 45 and 68, the Kondoh et al. reference discloses "when the semiconductor device is a high frequency element, using the electrode 7 as a ground line provides a shielding effect" or "since the active area is isolated from the outside world by the chip itself, circuit board, and wall member, especially when the semiconductor device is a high-frequency element, the electrical shielding effect can be expected", col. 9, lines 27-29 and lines 50-53. Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the shield of Kondoh et al. in Surface Acoustic Wave device and in MEM device because the shield would proved the Surface Acoustic Wave device or MEM device with proper shielding effect as taught by Kondoh et al.

Conclusion

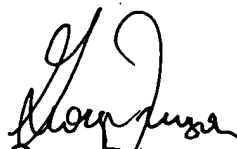
9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thanh V. Pham whose telephone number is 571-272-1866. The examiner can normally be reached on M-T (6:30-5:00).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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TvP
03/15/2005


George Fourson
Primary Examiner